AD-A124 970 REQUIRED OPERATIONAL CAPABILITY (ROS) NUMBER LOG 155 1/1
FOR AN ELECTRONIC CALIBRATION FACILITY (ECF)(U) MARINE
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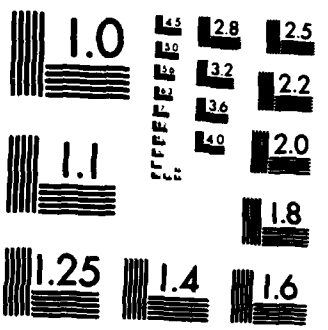

DEPARTMENT OF THE NAVY
HEADQUARTERS UNITED STATES MARINE CORPS
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ROC-24-3-10-avs

1 FEB 1983

From: Commandant of the Marine Corps
To: Distribution List

Subj: Required Operational Capability (ROC) No. LOG 1.55 for an Electronic Calibration Facility (ECF)

Ref: (a) MCO 3900.4B

Encl: (1) ROC No. LOG 1.55 for an Electronic Calibration Facility (ECF)

1. This letter establishes and promulgates ROC No. LOG 1.55 for an Electronic Calibration Facility (ECF). The ROC has been developed in accordance with the reference and is contained in the enclosure.

2. The Commanding General, Marine Corps Development and Education Command (Director, Development Center) is the Marine Corps point of contact for the development efforts pertaining to the ECF.

Eugene B. Russell

Eugene B. RUSSELL
DEPUTY CHIEF OF STAFF FOR RD&S

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REQUIRED OPERATIONAL CAPABILITY (ROC) NO. LOG 1.55
FOR AN
ELECTRONIC CALIBRATION FACILITY (ECF)

1. STATEMENT OF REQUIREMENT

a. A major consideration in the area of combat service support is the availability of adequate electronic calibration capability to support the ground electronic test, measurement, and diagnostic equipment (TMDE) used by the operating forces. The readiness of Fleet Marine Force (FMF) combat essential equipment is directly related to the FMF's ability to calibrate electronic TMDE quickly and accurately.

b. The ECF provides electronic calibration capability for the FMF and will be used in fourth echelon repairs in the Maintenance Battalion, Force Service Support Group (FSSG) and the Marine Air Control Group (MACG), Marine Aircraft Wing (MAW). The ECF will be used to provide required electronic calibration capability in both garrison and expeditionary environments.

c. An initial operational capability (IOC) is required during FY86.

2. THREAT AND OPERATIONAL DEFICIENCY

a. Potential enemy threats confronting the United States in the near- to long-range period are described in the Marine Corps Long-Range Plan (MLRP), Marine Corps Midrange Objectives Plan (MMROP), and General Operational Requirement (GOR) LOG-1. To successfully counter predicted threats the Marine Corps, as a force in readiness, must be capable of quick response organized and tailored for general and specific mission needs. The success of combat operations at any level of intensity is directly dependent upon the efficiency and effectiveness of the operational logistics support provided. The ability to maneuver, communicate, and coordinate/direct fire support can only be assured if the sophisticated weapons and equipment employed by the commander are supported by electronic TMDE that is both available and accurately calibrated. It is imperative that this electronic TMDE, which is extremely sophisticated in its own right, receive timely and efficient calibration.

b. Manpower shortages currently experienced by the FMFs in many technical fields can be expected to continue for the forseeable future. These shortages impact on the FMF's ability to provide timely calibration with the current ECF. This is due to the internal support time required to maintain the current system in an operational state. This support time reduces

manhours available to support the FMF's electronic TMDE and creates a calibration backlog.

c. The increasingly sophisticated weapons systems employed in the FMF require advanced electronic TMDE to support them. More complex calibration is, in turn, required to support the TMDE. The increased calibration requirement places greater demands on the current ECFs than can be accommodated through modernization and product improvement. The resulting technological gap is preventing efficient calibration of electronic TMDE.

d. The current ECF (AN/TSM-119) was fielded in 1970. In the past eleven years electronic TMDE has undergone several evolutions due to the advent of the microprocessor. This change in TMDE has caused the current ECF to become obsolete not only due to excessive support time and increasing sophistication of the TMDE, but also because of the volume of TMDE requiring calibration. This increase in volume coupled with problems associated with aging calibration standards has created an environment in which the current ECF is operationally deficient.

3. OPERATIONAL AND ORGANIZATIONAL CONCEPTS

a. Operational Concepts. The ECF will consist of a collection of calibration work stations installed in standard Marine Corps Expeditionary Shelter System (MCESS) shelters equipped with work benches, desks and storage cabinets. Environmental control will be provided by standard air conditioners. The ECF must fully support the current and projected electronic calibration requirments of the FMF between the mid 1980s and the late 1990s in the 4th echelon level calibration activities in the Marine Amphibious Force (MAF). The 4th echelon calibration maintenance functions performed in the ECF will include:

(1) Calibration of electronic TMDE in the following functional areas:

(a) Automotive TMDE.

(b) Electronic frequency counters.

(c) High-power radio-frequency TMDE.

(d) Low frequency TMDE.

(e) Multimeters.

(f) Small missile systems TMDE.

(g) Microwave TMDE.

(h) Oscilloscopes.

(2) On-site calibration for high density TMDE.

(3) Management of an instrument calibration procedure reference library.

(4) Shipping and receiving of equipment in the calibration cycle.

(5) Organic and customer equipment storage.

(6) Maintenance management and administrative functions.

(7) Limited calibration work station calibration support.

b. Organizational Concepts. The ECF will be designed and developed in a manner which permits the work stations to be removed for use in fixed facilities while in garrison and reinstalled in the appropriate shelter for operations in the field. ECF design will permit the using organization to support the mission of the organization as an element of a Marine Aircraft Wing (MAW), Force Service Support Group (FSSG), or as a task organized unit of a Marine Air-Ground Task Force (MAGTF).

(1) Traditional Organizations. The ECF will be used by the following FMF organizations:

(a) General Support Maintenance Company, Maintenance Battalion, FSSG.

(b) Marine Wing Communications Squadron, Marine Air Control Group, MAW.

(2) Task Organization. The ECF will be capable of reconfiguration by the above organizations to provide a tailored 4th echelon electronics calibration facility to support the operations of a Marine Amphibious Brigade (MAB) within the Brigade Service Support Group (BSSG), when required.

c. Inventory Objective. It is estimated that 20 ECFs will be required.

d. Special Logistic and Training Support Considerations.

(1) Logistics. Logistics considerations will play a major role in the development of the ECF. The calibration and repair requirements of the calibration standards which make up the individual work stations will require some support from activities external to the MAF. These requirements will be satisfied by the Marine Corps Standards Exchange Program (MCSEP) which will provide exchange standards to using organizations from a pool to maintain ECF readiness in the event of

failure or when a standard is due for calibration. Proper planning during the development phase will minimize the number of standards which must be supported external to the MAF.

(2) Training Support. Because the ECF work stations will consist of sophisticated commercial off-the-shelf items, special training will be required for MOS 2874, Metrology Technician, in the operation and use of the individual work stations and for MOS 2871, TMDE Technician, in the repair of standards which will be repaired within the MAF.

4. ESSENTIAL CHARACTERISTICS

a. The ECF must be able to:

(1) Operate in climatic design categories one through four, as defined in AR 70-38, without degradation of capabilities.

(2) Operate a minimum of 20 hours per day for a 90 day period in an expeditionary environment without disruption of service or function.

(3) Operate on 60 or 400 hz prime power.

(4) Be divided into the following modules:

(a) A basic Module which will have the capabilies which are common to both the FSSG and the MWCS

(b) An FSSG Supplement Module which will have the required additional workload and measurement capability of the FSSG.

(c) An MWCS Supplement Module which will have the required additional capability (workload only) for the MWCS.

(d) An FSSG On-Site Support Module which will have required measurement capability for on-site calibration support for high density (like type) organizations and low density organizations with large amounts of TMDE.

(e) An MWCS On-Site Module which will have the required measurement capability to provide on-site support to MAW organizations.

(f) An FSSG Administrative Support Module which will provide storage and administrative work space facilities required for TMDE calibration and maintenance at the FSSG when deployed.

(g) An MWCS Administrative Support Module which will provide storage and administrative work space facilities required for TMDE calibration and maintenance at the MWCS when deployed.

b. Selection of Calibration Standards and Equipment is to be carried out as follows:

(1) Standards and equipment will be selected using economic analysis techniques where applicable. A ten year projected life is to be used. All cost elements will be considered in the analysis including investment costs and maintenance of the standards or equipment. These costs will include (MCSEP) operating costs. MCSEP pool items and additional standards required will also be included under investment costs. Labor cost to calibrate the TMDE for which the standards or equipment are intended to support will also be included.

(2) In conjunction with the economic analysis, a determination of risks for various alternatives should be assigned. For example, a specially designed standard to satisfy a measurement requirement may carry a greater risk from a support standpoint than a Navy standard item. If the risk is unacceptably high for an alternative, it should not be selected even though it is the most cost effective.

(3) In conjunction with the economic analysis discussed above, the order of preference for selection of calibration standards and equipment is:

(a) Standard Navy Calibration Equipment (NCE).

(b) Commercial off-the-shelf equipment.

(c) Modified commercial off-the-shelf equipment.

(d) Special equipment designed for the application.

(4) Although cost is a major factor in selection of the calibration standards and equipment, equally important is the time savings that a standard or equipment may offer over another one being considered. The time savings will be reflected in the economic analysis discussed above. Additionally, the time savings should be included in determining the risk factor discussed above. The rationale for this is that the calibration workload, which already exceeds manpower availability within the FMF, is continually increasing and a commensurate increase in calibration personnel in the future is unlikely.

c. Reliability, maintainability and availability, though not specifically mentioned, are inherent in the selection process for calibration standards and equipment described above.

d. NBC survivability of the ECF is a function of the shelter selected to house the calibration capability. It is anticipated that the Marine Corps Expeditionary Shelter System (MCESS) program will be used to perform this function. The elements of the MCESS program will be tested for suitability prior to use as a part of the ECF. It is necessary that the ECF be capable of continual operation in an environment which has been contaminated by NBC attack. This capability, however, will be driven primarily by personnel precautions and/or protective measures which are extraneous to the ECF design.

e. The bands of performance for the ECF will be a function of the MCESS program and determined by a study of Marine Crops calibration requirements.

5. OTHER WARFARE AREAS CONCERNED. The introduction of this system will primarily affect Mission Area 216.4 (Combat Service Support-Shelters). It is anticipated that the fielding of this system will have negligible effects across all other functional categories.

6. RELATED EFFORTS

a. U.S. Marine Corps promulgated Required Operational Capability (ROC, LOG-1.20 for Marine Corps Expeditionary Shelter System (MCESS), dated 20 August 1977.

b. U.S. Marine Corps proposed Operational Capability (ROC) No. LOG 1.51 for the Electronic Maintenance Complex (EMC).

7. TECHNICAL FEASIBILITY, ENERGY-EFFECTIVENESS IMPACT, AND COST FORECAST

a. Technical Feasibility. The development of an ECF is technologically feasible by using the basic shelters developed under the MCESS program, the design efforts of the Electronics Maintenance Complex (EMC) program, commercially available appointments (furnishings), and test equipment procedures for the program. The Depot Maintenance Activity, Marine Corps Logistics Base, Albany, GA has the capacity, capability, and requisite experience for this level of development effort.

b. Energy-Effectiveness Impact. The ECF is not itself an energy intensive system. However, ECF environmental control support for many of the required operating regions will demand considerable energy from Environmental Control Units (ECUs) and subsequently prime power generators. If the conditions discussed in the Technical Feasibility paragraph are aggravated by poor sealing, then specified (when called out) ECU support may be totally inadequate. This would have an adverse effect on energy effectiveness. To avoid this, it is recommended that a review of MCESS units be made and an assessment of performance after repeated set up and tear down cycles be made unless such

data is already a matter of record and is available. It is also recommended that during the five-year development period a comphrehensive evaluation be conducted on a fully equipped prototype system. Accelerated life testing should be included to document conditions after repeated cycling. A successful effort in this area together with sound engineering practices in the other development areas affecting energy (power distribution, ventilation design, air flow/cooling, selection of energy efficient units, elimination of low priority power users, etc.) should result in an energy efficient system.

c. Cost Estimate. Furnishing for the 636 MCESS shelters which are being procured for the EMC system are estimated to cost $1,900,000. It is estimated that 90 shelters from the EMC program will be configured to create 20 ECFs. Costs to maintain the equipment housed in each ECF is a function of the equipment itself and will not be a direct ECF maintenance cost.

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